TREND STUDY 17-14-96 (old 21-9)

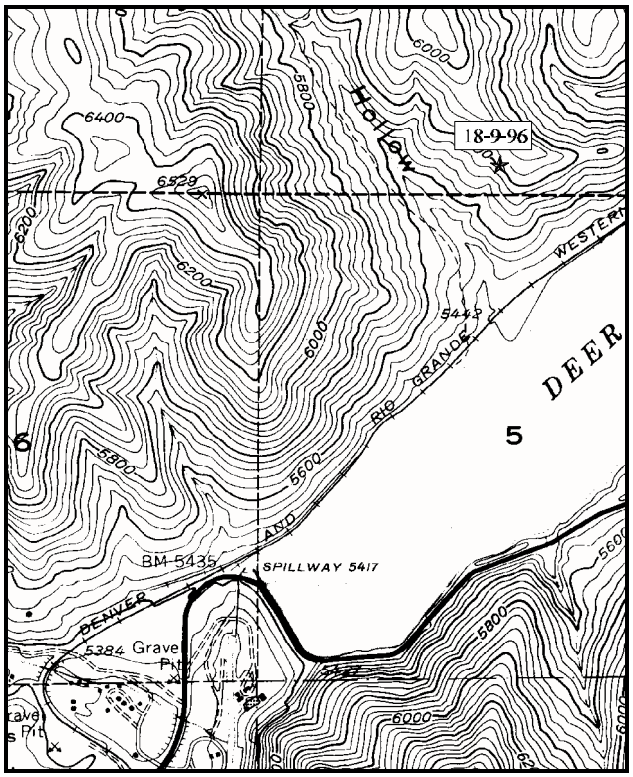
Study site name: Hoovers Hollow . Range type: Big sagebrush-grass .

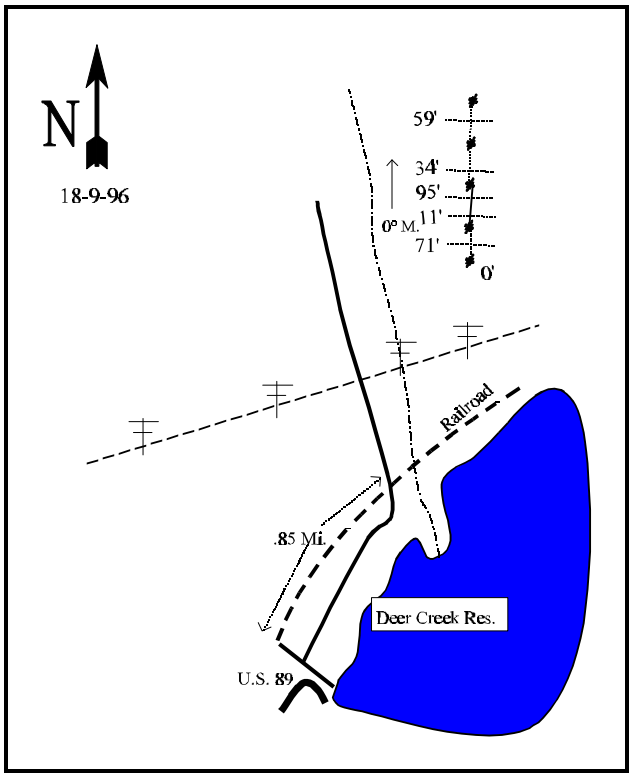
Compass bearing: frequency baseline 0 degrees.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) Line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the locked gate at the southwest corner of Deer Creek Reservoir, proceed 0.85 miles along the northern edge of the reservoir. Stop where the road crosses the railroad tracks. From this point, walk up the road leading towards Hoover Hollow to a faint road to the northeast following power lines. Walk to the second pole across a small drainage and partially up the hillside. From the power pole walk 232 paces at an azimuth of 0 degrees true, to the 0-foot baseline stake. A red browse tag, number 3949, is attached to the 0-foot baseline stake.





Map Name: Aspen Grove, Utah Diagrammatic Sketch

Township 4S , Range 4E , Section 32 , UTM COOR: 4-55-949E 44-74-447N

DISCUSSION

Trend Study No. 17-14 (21-9)

The Hoover's Hollow study is located near the mouth of Hoover Hollow on the west side of Deer Creek Reservoir. The study is near a ridge top on a moderately steep (24%) south-southwest facing slope on the north side of the hollow. Elevation is approximately 5,800 feet. Winter deer use on ridges and slopes, such as this one, is usually extremely heavy throughout the entire area. It was reported in 1989 that domestic sheep have had significant impacts on this site for many years. The reservoir is approximately 3/4 mile downslope from the site.

Soil texture is a clay loam with an average temperature of 49°F at a depth of 7 inches. The soil is very rocky but moderately deep. Effective rooting depth (see methods) is almost 9 inches. Soil depth measurements were difficult to take due to the rocky nature of the upper profile. In past years, a high rate of erosion was reported with the loss of topsoil. In 1996, no surface erosion was noticeable due to the protective ground cover.

Vegetative cover was estimated at 36% in 1996, nearly 50% of which is contributed by annual species. Litter cover is estimated at 28% and rock and pavement cover combined is estimated at 26%. Bare ground cover has stayed nearly the same at 12%.

As reported in 1989, browse forage remains very limited. Mountain big sagebrush has an estimated density of 340 plants/acre with the age structure shifting to a more mature population. Sixty percent of the sagebrush were heavily hedged in 1989, while only 29% where classified as heavily hedged in 1996. Vigor is good with only 6% exhibiting poor vigor. The white rubber rabbitbrush exhibits some light browsing with an estimated density of 480 plants/acre. Twenty-five percent of the population were classified as decadent. This is a decrease from the 54% reported in 1989. No plants were reported as decadent in 1983. Broom snakeweed density increased to 11,540 plants/acre in 1996. This great increase from 2,466 plants/acre as reported in 1989 may be due to the increased sample size now used which gives better population estimates for species that have clumped or discontinuous distributions. This population was split between young and mature plants. An incredible 21,280 plants/acre were estimated for seedlings in 1996, but it is very unlikely many of the plants will survive the summer months. The prickly pear cactus population appears to be stable at 1,000 plants/acre in 1996. In 1983, there was an estimated 6,100 plants/acre which declined to 733 plants/acre in 1989. Other browse scattered throughout the site include snowberry, antelope bitterbrush, and serviceberry.

Sum of nested frequency for perennial grasses has stayed nearly the same since 1989. Although annual species were not reported in previous years, cheatgrass is the most abundant grass followed by Sandberg bluegrass and bluebunch wheatgrass.

Forbs are very diverse and provide moderate cover in the herbaceous understory. The most abundant forbs are annual species and include storksbill, pale alyssum, *Holosteum umbellatum*, and little flowered Collinsia. Annual sunflower was noticeably not sampled in 1996 after a having a quadrat frequency of 68 in 1996. Hairy golden aster and false goatsbeard increased significantly in nested frequency value. The forb component remains dominated by other weedy species as well, including thistle, toadflax, and yellow salsify.

1983 APPARENT TREND ASSESSMENT

Overall trend is declining, especially vegetatively. Soil, although eroded, is capable of producing more desirable forage. However, to do so would require more than just rest from use. Some type of direct rehabilitation effort would be

required if any meaningful short term improvement is to occur.

1989 TREND ASSESSMENT

While the site remains in poor condition, the vegetative trend is not as rapidly downward as thought in 1983. Perennial grasses, although limited in production and desirability, have increased, as did the density of sagebrush. The vegetative trend is stable.

1996 TREND ASSESSMENT

Soil trend is slightly improving with increasing litter cover and decreasing bare soil. Cryptogamic cover has increased to nearly 3% since 1989, when it was estimated to be at less than 1%. The mountain big sagebrush population has remained stable since 1983 with percent decadency decreasing over all years. Vigor has improved and utilization has decreased. One concern is the estimated density of broom snakeweed in 1996. At 11,540 plants/acre, an increase of over 9,000 plants/acre since 1989, this population should be carefully monitored. This great increase is likely due to an increased sample size used in 1996, but there were also a high number of young and seedlings currently and in previous years. The browse trend is stable. The herbaceous understory is stable, but with a poor composition. Native perennial grasses are still present yet they are greatly out numbered by annuals and other weedy species.

TREND ASSESSMENT
soil - slightly improving
browse - stable
herbaceous understory - stable, but very poor composition of weeds and annuals

HERBACEOUS TRENDS --
Herd unit 17 , Study no: 14

Type	Species	Nested Frequency '83	'89	'96	Quadrat Frequency '83	'89	'96	Average Cover % '96
G	Agropyron cristatum	-	1	-	-	1	-	-
G	Agropyron spicatum	a18	b37	b65	7	19	32	3.63
G	Bromus tectorum (a)	-	-	346	-	-	98	5.82
G	Poa secunda	a35	b180	b159	18	65	61	3.69
G	Sporobolus cryptandrus	-	-	4	-	-	1	.03
Total for Grasses		53	218	574	25	85	192	13.17
F	Agoseris glauca	a-	a-	b32	-	-	15	.19
F	Allium acuminatum	a-	a3	b18	-	1	10	.05
F	Alyssum alyssoides (a)	-	-	302	-	-	94	1.58
F	Astragalus tenellus	-	-	4	-	-	2	.04
F	Astragalus utahensis	a2	a2	b13	1	2	5	.08
F	Castilleja linariaefolia	ab2	a-	b8	1	-	5	.10
F	Calochortus nuttallii	a-	b6	b12	-	4	6	.03
F	Cirsium spp.	65	78	67	31	38	32	1.11
F	Collomia linearis (a)	-	-	21	-	-	11	.05

Type	Species	Nested Frequency '83	'89	'96	Quadrat Frequency '83	'89	'96	Average Cover % '96
F	Collinsia parviflora (a)	-	-	182	-	-	64	1.11
F	Cymopterus spp.	$_{a}$-	$_{a}$-	$_{b}$31	-	-	15	.10
F	Cynoglossum officinale	-	4	-	-	2	-	-
F	Draba spp. (a)	-	-	50	-	-	16	.10
F	Erodium cicutarium (a)	-	-	315	-	-	101	6.45
F	Eriogonum racemosum	$_{a}$-	$_{ab}$1	$_{b}$11	-	1	5	.02
F	Galium aparine (a)	-	-	1	-	-	1	.00
F	Helianthus annuus (a)	$_{a}$6	$_{b}$173	$_{a}$-	4	68	-	-
F	Heterotheca villosa	$_{a}$5	$_{a}$18	$_{b}$88	3	7	35	1.67
F	Holosteum umbellatum (a)	-	-	190	-	-	62	2.63
F	Lactuca serriola	-	3	2	-	1	2	.01
F	Linaria dalmatica	-	-	4	-	-	2	.03
F	Machaeranthera spp. (a)	-	-	44	-	-	17	.08
F	Oenothera spp.	$_{a}$-	$_{a}$-	$_{b}$24	-	-	9	.04
F	Polygonum douglasii (a)	-	-	3	-	-	1	.00
F	Ranunculus testiculatus (a)	-	-	58	-	-	20	.20
F	Tragopogon dubius	$_{a}$64	$_{b}$10	$_{a}$73	34	6	34	.78
F	Verbascum thapsus	-	-	4	-	-	2	.15
Total for Forbs		144	298	1557	74	130	566	16.69

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 17 , Study no: 14

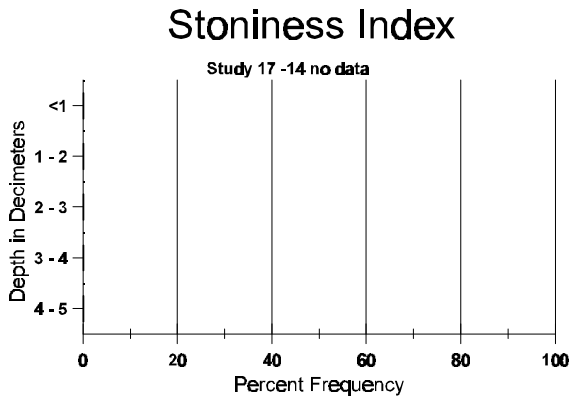
Type	Species	Strip Frequency ‘96	Average Cover % ‘96
B	Amelanchier alnifolia	2	.15
B	Artemisia tridentata vaseyana	15	1.16
B	Chrysothamnus nauseosus albicaulis	18	.72
B	Gutierrezia sarothrae	73	1.55
B	Opuntia spp.	40	2.77
B	Symphoricarpos oreophilus	1	.15
Total for Browse		149	6.51

BASIC COVER --
Herd unit 17 , Study no: 14

Cover Type	Nested Frequency '96	Average Cover % '83	'89	'96
Vegetation	386	2.00	9.25	36.09
Rock	307	9.25	13.50	18.57
Pavement	311	12.25	41.75	7.71
Litter	395	62.75	20.50	28.28
Cryptogams	111	.25	.75	2.79
Bare Ground	278	13.50	14.25	12.42

SOIL ANALYSIS DATA --
Herd Unit 17, Study no: 14

Effective rooting depth (inches)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
8.9	49.2 (7.2)	7.3	34.9	35.1	30.0	2.6	25.6	92.8	.5



PELLET GROUP FREQUENCY --
Herd unit 17 , Study no: 14

Type	Quadrat Frequency '96
Rabbit	1
Elk	10
Deer	28

BROWSE CHARACTERISTICS --
Herd unit 17 , Study no: 14

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier alnifolia																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	1	-	-	-	-	-	-	-	1	-	-	-	20	13	21	1
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	1	-	-	-	1	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)													'83		0	Dec:		0%
													'89		0			0%
													'96		40			50%
Artemisia tridentata vaseyana																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	83	4	-	-	-	-	-	-	-	-	4	-	-	-	133			4
	89	1	2	2	-	-	-	-	-	-	5	-	-	-	166			5
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	83	-	-	1	-	-	-	-	-	-	-	-	1	-	33	20	22	1
	89	1	1	2	-	-	-	-	-	-	3	1	-	-	133	15	18	4
	96	-	6	5	-	-	-	-	-	-	11	-	-	-	220	17	31	11
D	83	-	-	3	-	-	-	-	-	-	2	-	1	-	100			3
	89	-	-	3	-	-	-	-	-	-	2	-	1	-	100			3
	96	1	2	-	-	-	-	-	-	-	2	-	-	1	60			3
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9
Total Plants/Acre (excluding Dead & Seedlings)													'83		266	Dec:		38%
													'89		399			25%
													'96		340			18%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus nauseosus albicaulis																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	96	1	1	-	-	-	-	-	-	-	2	-	-	-	40			2
M	83	16	-	-	-	-	-	-	-	-	16	-	-	-	533	24	30	16
	89	2	2	-	-	-	-	-	-	-	4	-	-	-	133	18	20	4
	96	6	6	4	-	-	-	-	-	-	15	-	1	-	320	23	39	16
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	2	3	1	-	-	-	-	-	-	2	2	-	2	200			6
	96	4	1	1	-	-	-	-	-	-	3	-	-	3	120			6
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
Total Plants/Acre (excluding Dead & Seedlings)													'83		533	Dec:		0%
													'89		366			55%
													'96		480			25%
Gutierrezia sarothrae																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	100	-	-	-	-	-	-	-	-	100	-	-	-	3333			100
	96	1063	-	-	1	-	-	-	-	-	1064	-	-	-	21280			1064
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	96	338	-	-	-	-	-	-	-	-	338	-	-	-	6760			338
M	83	98	-	-	-	-	-	-	-	-	98	-	-	-	3266	9	11	98
	89	51	-	-	-	-	-	-	-	-	50	-	1	-	1700	8	10	51
	96	234	-	-	3	-	-	-	-	-	237	-	-	-	4740	5	8	237
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	20	-	-	-	-	-	-	-	-	7	-	7	6	666			20
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5
Total Plants/Acre (excluding Dead & Seedlings)													'83		3266	Dec:		0%
													'89		2466			27%
													'96		11540			0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	3	-	-	-	-	-	-	-	-	2	-	1	-	100			3
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	10	-	-	-	-	-	-	-	-	9	-	1	-	333			10
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	83	183	-	-	-	-	-	-	-	-	183	-	-	-	6100	6	6	183
	89	9	-	-	-	-	-	-	-	-	7	-	2	-	300	5	22	9
	96	28	-	-	-	-	-	-	-	-	28	-	-	-	560	6	33	28
D	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	3	-	-	-	-	-	-	-	-	-	-	2	1	100			3
	96	20	-	-	-	-	-	-	-	-	11	-	1	8	400			20
X	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
Total Plants/Acre (excluding Dead & Seedlings)													'83		6100	Dec:		0%
													'89		733			14%
													'96		1000			40%
Purshia tridentata																		
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	28	0
Total Plants/Acre (excluding Dead & Seedlings)													'83		0	Dec:		-
													'89		0			-
													'96		0			-
Symphoricarpos oreophilus																		
Y	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	83	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	11	0
Total Plants/Acre (excluding Dead & Seedlings)													'83		0	Dec:		-
													'89		0			-
													'96		20			-